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BIG FELLOW

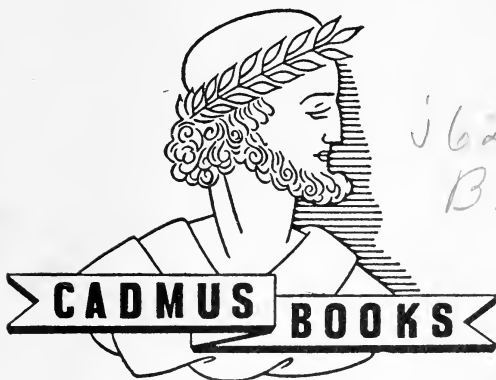
The Story of a Road-making Shovel

By DOROTHY WALTER BARUCH

WITH ILLUSTRATIONS BY

JAY VAN EVEREN

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BIG FELLOW

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To those children who stand entranced in front of the huge monsters of construction which inhabit this modern world on all sides—to those children who stop to gaze in wonder at the whirling of a concrete mixer or the digging of an excavating shovel—to those children who, seeing such things, propound countless questions—and more especially to their mothers—this book is sympathetically dedicated.

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Acknowledgments

Sincere acknowledgments are due to Herbert, Milton, and Edgar Baruch for their patience in supplying many of the technical details without which these stories could not have been written; to my father, Clarence Walter, for his careful consideration of the manuscript and his suggestion concerning further details; to the Koehring Company, Milwaukee, for their coöperation in providing data on the manufacture of shovels; and, finally, to my young son for those incessant and insistent demands of his which furnished the incentive to bring forth these stories.

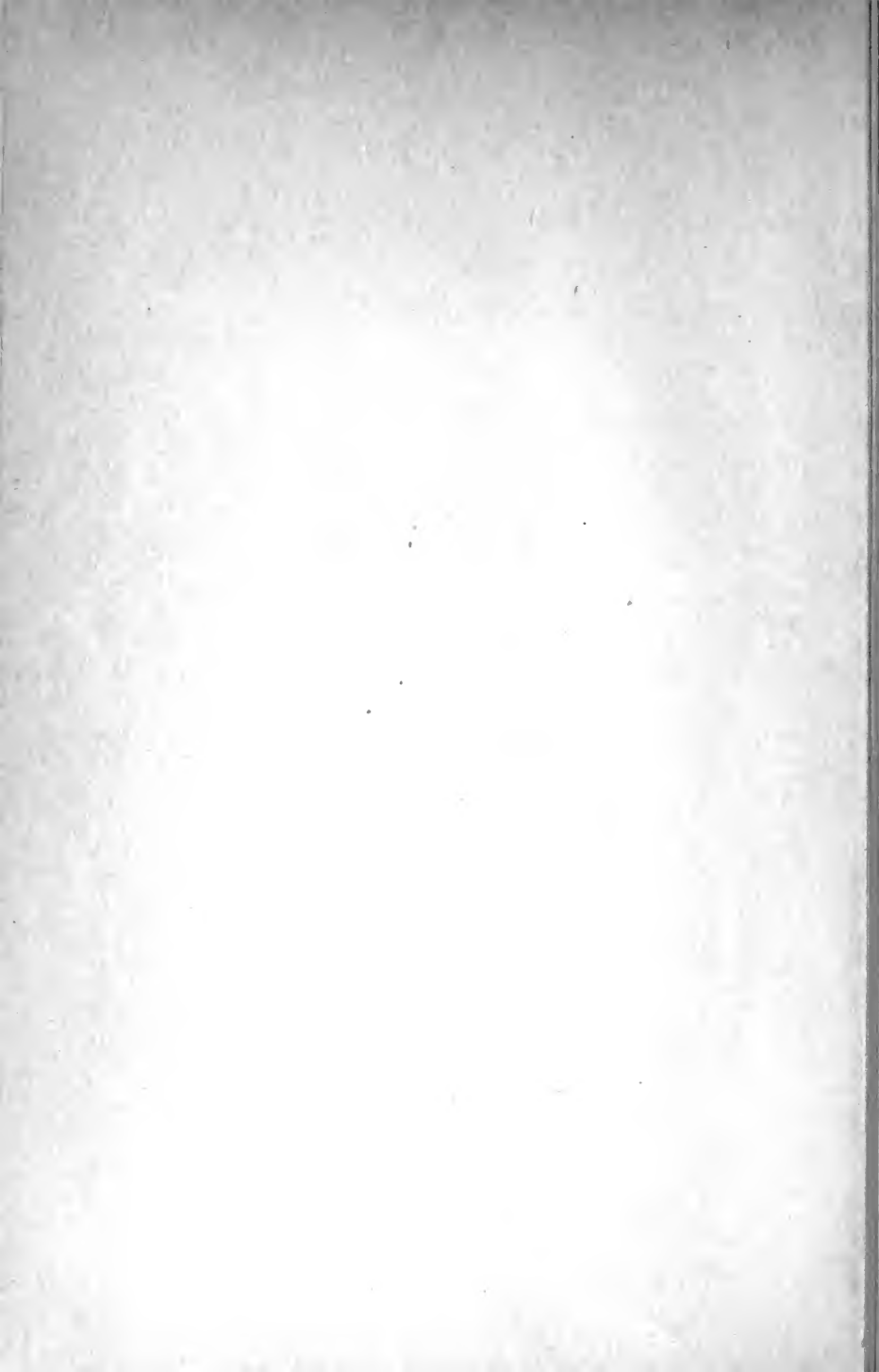




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BIG FELLOW



*Do you ever see
Shovels and mixers and other machines
That scrape and dig and churn?*

*Do you ever stand
And watch them work
And build and scoop and turn?*

*Have you ever known
Where they come from,
These great big shovels strong?
Have you ever wondered
How they're made,
As you've watched them work along?*

*You know what they do—
Don't you?*

*You see what they do
That's new.*

*Want to read about them, too?
Why, then read these pages through.*

HOW THE ROAD WAS BUILT

ONCE there was a little boy. His name was Ned. He lived in the country in a red wooden house. All around the red wooden house were fields and fields and more fields of waving wheat. There were no other houses standing right next to Ned's, there were no stores near his home, nor any busy markets; there were no street cars and street-car tracks on the streets, because . . . there were no streets. No—no streets at all. Imagine!

No smooth, paved streets! It's true there was a dusty dirt road that ran along between the fields and happened to pass right straight in front of Ned's house; but the dirt road could hardly be called a street, it was so bumpy and rutty and rough.

This little boy, Ned, had just had a birthday. Do you know what he had gotten for his birthday? Can you guess? Well, he'd gotten a bicycle for his birthday, a brand-new, shiny blue bike with a brown leather seat, with white tires and wire wheels, with silvery nickel handlebars, and with a bell which could jingle and tingle merrily, merrily, as if to say: "Ding-a-ding! Come ride. Come ride, ride, ride."

But then, that was the trouble. Ned couldn't ride, ride, ride his bike. How could he when there was no road to ride it on ? How could he when there was no road to go skimming along?

He tried to ride it on the dusty dirt lane. He took it out and hopped on, but he couldn't go very far—no, not very far, because the ground was so bumpy and ratty and rough. His bike just stuck. It went:

y	b	y	b
t	u	t	u
e	m	e	m
p	p stop	p	p
m		m	stop,
u		u	
b		b	

which made Ned very sad—very sad in-

deed. He had to put his brand-new, shiny blue bike back into the shed, for that was the only thing he could do. Then he sighed and sighed sorrowfully to himself. Then he walked to the garden fence. Then he looked out at the dusty dirt road and wondered why it was so bumpy and rutty and rough, and thought to himself:

“Oh, how I’d like
To ride my bike,
Skimming along,
Singing a song.”

After a while, down the lane came a farmer driving his horse, joggedy-jog, joggedy-jog, on his way to the city that lay some distance off. He caught sight of Ned.

“Well, little boy,” he said, “why do you look so sad? What’s the matter?”

Ned looked at him and answered,

“Oh, how I’d like
To ride my bike,
Skimming along,
Singing a song.”

“Guess you’ll have to move to where there’s a better road than this,” answered the farmer as he drove off joggedy-jog, joggedy-jog, leaving Ned far, far behind.

After a while, down the lane came a cowboy riding his horse, trot, trot, trot, and driving cows and calves ahead of him. He stopped. He looked at Ned, and then he laughed. “Well, if you aren’t the cheerful-looking sight. What’s the matter? Got a pain?”

Ned shook his head. “No-o,” he said, “But

“Oh, how I’d like
To ride my bike,
Skimming along,
Singing a song.”

The cowboy laughed again. “Say, boy, where do you think you are?” he asked. “In the city? These roads are all right for horses, but not for bikes,” and away he rode, trot, trot, trot, leaving Ned far, far behind.

After a while down the lane came two men. They were walking. One of them carried something that looked like a slim bundle of sticks over his shoulder. They stopped right in front of Ned’s gate. The man carrying the bundle put down his load and stood the sticks on end, spreading them apart at the bottom so that they

looked like a little wooden tent coming to a point at the top. Ned could see how a small pipe was fastened to the top, cross-wise over the point. The men bent down and peered through the pipe. They peered and they peered. One man walked a little distance away, while the other commenced calling things to him. Suddenly they noticed Ned.

“Hello there!” said the tallest. “You look blue. In fact, I don’t believe I ever saw a bluer-looking boy. What’s the trouble? Anything wrong?”

“Yes,” answered Ned. “Yes, there surely is. You see, I have a brand-new, shiny blue bike, that I got for my birthday, and

“Oh, how I’d like
To ride my bike,
Skimming along,
Singing a song.”

But I can’t ’cause there’s no smooth road here, nothing but fields and fields and more fields, and a bumpy, rutty, rough lane.”

The men grinned. They looked first at each other and back at Ned. They started to laugh.

“Well, I guess you’ll be glad we came,” said the one. “Shall I tell you what we came for? . . . Yes? . . . Well, we’re here to measure the ground. We’re called surveyors. We look at the ground through this machine. We see how uneven it is. We see just where it’s level and just where

it's bumpy; and when we're finished, we go back and report all about it. Want to know why we're doing it?... Yes?... Can't you guess? . . . Well, I'll tell you. We're surveying because something is going to be built here, something you want very much, something smooth and hard and firm. Now can't you guess? . . . A road, yes, a road is going to be built here—a concrete road.

“So smile, smile, smile
For a little while,
Then you'll know, know, know.
You can go, go, go.”

The men kept on looking at the ground through their machine. They found out where it was level and where it was bumpy and rough. And when at last their work

was finished, they left, carrying their queer little instrument with them.

Ned was so happy. He jumped into the air once, he jumped into the air twice, he jumped into the air three times for joy.

"There's going to be a road!" he cried. "There's going to be a road! I'm so glad, I'm so glad, there's going to be a road!"

Not so many days later a great noise came down the lane—a clattering and clanging and banging. A huge gasoline shovel was moving on its tractor base across the fields—clumpety rump, clumpety rump, clumpety rump, it was coming.

It stopped in front of Ned's house. Before long its driver put it busily, busily to work. Its machinery ground chug, chug-a-chug. Its levers creaked, eak, eak, and its

huge body groaned as it swung slowly around into shoveling position. Into the earth it bore, burra, burra, burr. It lifted rocks and dust and dirt in its great shovel dipper and carried them up, up, up, emptying them into the heavy dump trucks that had come along for that purpose. Then down into the earth again, the teeth on its dipper biting through rocks and dust and dirt, down, down, down—digging away all the top soil.

Ned watched it work and listened to its noise. It seemed to be saying:

“I’m helping build the road;

I go dig, dig, you see.

I say, ‘Chug, chug-a-chug,’

And work most busily.”

The workmen explained to Ned how

most of the loose topsoil must be dug up and removed in order that the roadbed be firm underneath and have a solid foundation. They told him how always below the loose soil and pebbles and earth on top there lay firm, hard, rocky ground, and that the shovel's work was to dig and dig and dig until this rocky ground was reached.

For many days the shovel dug and dug and dug. Each day it moved a bit farther from Ned's house so that at last the day came when Ned could barely see it in the distance. Then he called after it, "Now that the shovel has dug away the topsoil, now

Can I ride my bike
The way I would like?"

But the shovel seemed to answer from far away:

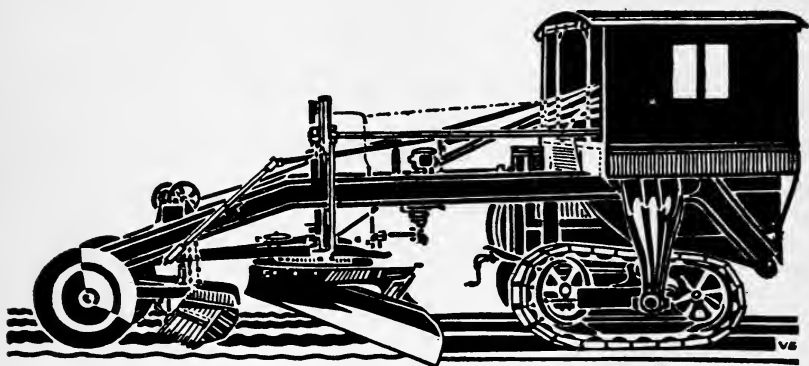
“No, no, no,
You still can’t go.”

Not so many days later there came down the lane some wide steel graders with sharp, cutting knife-edges, to scrape the roadbed; and some heavy rakes with pointed iron prongs to rake and rake and scrape some more. Their edges and prongs cut into the ridges and rough spots:

“We’re helping build the road;
We go scrape, scrape, you see.
We cut and rake the bumps away
And work most busily.”

Ned watched the graders as they cut away the ridges, and he watched the

rakes as they scratched and smoothed the roadbed. And when he saw that their work was done and that they were going to move farther along, he called out to them, "Now



that the shovel has dug up the topsoil, and now that the graders have scraped the rough spots and the rakes have raked and smoothed, now,

Can I ride my bike
The way I would like?"

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But the graders and rakes seemed to answer as they went on with their scraping and raking some distance away:

“No, no, no,
You still can’t go.”

“I can’t imagine what sort of machinery will come next,” thought Ned. “What kind do you think?” And, as if in answer to his question there came puffing and steaming down the roadbed a great black noisy machine with a driver sitting on a seat above its heavy roller. This machine packed down the dirt that the scrapers and rakes had loosened. A giant steam-roller it was, with a great roller that pressed and padded and hardened the soil beneath its weight.

“I’m helping build the road;
I roll the ground, you see.
I say puff, puff, puff, puff,
And work most busily.”

After the steam-roller had done all that it could near Ned’s house, it too moved on along the roadbed that now stretched away into the distance, between fields and fields and fields. As it moved Ned called after it, “Now that the shovel has dug up the topsoil, and now that the graders have scraped the rough spots and the rakes have raked and smoothed, and the steam-roller has packed and hardened the ground, now

Can I ride my bike
The way I would like?”



A GIANT STEAM-ROLLER IT WAS



But the puffing of the steam-roller in the distance seemed to answer:

“No, no, no,
You still can’t go.”

Ned ran back to the shed to look at his bike. He smiled to himself as he thought of riding along the new road that was being built. He smiled as he pictured himself sitting on top of that brown leather seat, holding onto the shiny nickel handle-bars, with his pedals going 'round and 'round and the blue wire wheels going 'round and 'round, and the little bell tinkling, ding-a-ding, whenever he wished. He thought, too, of how the wind would rush through his hair and past his ears, and of how he would go flying smoothly

on his bike away, away, over the new road that was being made.

Not so many days later there came another great noise and clatter and clang; and with it there rolled along the roadbed a concrete-mixer,—a huge paving-mixer, followed by trucks carrying gravel, and trucks carrying sand, and more trucks carrying bags of cement. The mixer, with its tall funnel-like skip and great round drum, stopped in front of Ned's house, and the mixer-man, who had been handling its levers, jumped down.

"Any water around here?" he asked. "We need some water to help us make concrete."

"Plenty of water," laughed Ned, as he showed the man where there was a faucet

to which he could attach his hose. The man screwed on the hose so that the water ran through it to fill the tank near the drum.

And then the work of the mixer began: The man pressed a lever. Down went the skip. Into it pattered gravel and sand. Into it powdered white, floury cement. Up went the skip, up and up, emptying all with a scrunch and a runch, right into the great round drum.

Ned stood and watched.

Ned saw the work.

'Round and 'round went the drum,
'round and 'round, mixing and mixing and
mixing.

Ned heard it churn.

He thought that it sang,

“I’m helping build the road;
I make concrete, you see.
My drum goes ’round and ’round,
And works most busily.”

’Round and ’round and ’round! ’Round and ’round and ’round—until there came pouring from the drum the dirtiest-looking gray mixture.

Ned saw it and thought it looked like mud. Ned felt it and thought it felt like mud. Yes, just as moist and wet as mud at the bottom of a rainy puddle. But it wasn’t mud. No, it was . . . wet concrete.

Workmen spread it on the roadbed and smoothed it, first one mixer-full and then another.

Over and over again, over and over, the

mixer turned, the mixer churned, changing sand and gravel and white floury cement into . . . wet concrete.

And as it did its work, it slowly moved farther and farther away, until when it was almost out of sight, Ned called after it:

“Now that the shovel has dug up the topsoil, and now that the graders have scraped the rough spots and the rakes have raked and smoothed, and the steam-roller has packed and hardened the ground; now that the mixer has poured out the concrete and the men with trowels have spread it on, now

Can I ride my bike

The way I would like?”

But the mixer seemed to call back:

“No, no, no,
You still can’t go.”

“Why, oh, why?” sighed Ned. And as if in answer, the mixer’s chug, chug from way away in the distance, seemed to be saying:

“But smile, smile, smile
For a *tiny* while.
Then you’ll know, know, know
You can go, go, go.”

After that the concrete was left to dry for four hours. Then the workmen returned to cover it with earth, which they watered that day and the next and the next. Every day for twenty days they watered it, to keep the concrete moist underneath.

At last when those twenty days were

ended, they brought their shovels and scrapers, and they shoveled and they scraped away the earth until there came into sight from below a hard, firm road of concrete that shone white and even as it stretched smoothly between fields and fields and fields, way away into the distance.

Ned ran back to the shed. He brought out his bike, with its bright blue enameled body and shiny nickel handle-bars, with its white tires and its wire wheels. He hopped on. Around went the pedals, around went the wheels, and away went Ned, sailing down the smooth new road, sitting on top of his bike. The wind rushed through his hair and past his ears. And every so often, as he rode, his bell

tinkled merrily, merrily, as if to say:
“Ding-a-ding! Ride, ride, ride.”

“Yes,” laughed Ned, “Yes, now

I *can* ride my bike
The way that I like,
Skimming along,
Singing a song.”

And that is how the road was made!

2

HOW THE SHOVEL GOT ITS BOOM

NED went riding and riding and riding along on his new bicycle between fields of wheat and past farmhouses with cows and horses in their pastures, and chickens and pigs in their pens, until at last he came to where the fields grew smaller and the houses stood closer together.

“This must be near the city,” thought Ned. And right he was, because pretty soon he was able to see ahead of him

many, many buildings, all crowded together. They looked dark and gray in the distance, but as Ned came nearer he could make out their shapes and outlines, and could notice how the chimneys of some of the buildings nearest him were sending up smoke in heavy, smudgy columns to the sky.

After a little while he came to a great gray building with many, many chimneys lazily spouting out dirty black smoke. There was a high board wall which reached all around this building. In this wall there was a gate. . . . And here something strange happened: All of a sudden, Ned's bike turned into the gate—quite of its own accord, it seemed, quite without any warning—just as if it were doing nothing

strange at all, Ned's bike turned into the gate.

Ned never did understand exactly *how* it happened. Ned never did understand exactly *why* it happened. All he knew was that suddenly, instead of being outside the gray fence, he found himself inside the gray fence, staring up at the dark walls and windows and doors and chimneys of the building in front of him.

Then he looked around, and saw that here, in the yard about him, on all sides, stood . . . what do you think? Machines! Yes, machines, and very familiar-looking machines they were!

"Well," grinned Ned, "if that isn't the very same mixer that mixed the concrete for my road, it must be its twin brother.

Why, there's another, and another mixer, and still another. A whole row of mixers! And over there some rakes and graders; lots of them, too! And, hello! If there isn't



old friend gasoline shovel, the one who did so much of the good work digging our road."

Ned went nearer to the shovel which

had caught his eye. He looked it over, up and down.

"No," he said, "I guess you're not the same one. You're too new. You don't look as if you'd done any work at all. And, say, look here! If there isn't another one just like you, and another and another. Whew!! Gee!!! Whew!! I never did see so many shovels all together in my life. I wonder where I am, anyway. What sort of a place is this?"

Ned walked slowly along the line of gasoline shovels. He gazed admiringly at them. "You surely are fine fellows!" he said. "You surely have strong tractor bases, haven't you, to move you steadily over even the roughest, bumpiest kind of ground? You surely have mighty swell

cabs, haven't you, for your drivers to sit in? You surely have slick steel turntables, haven't you, to swing you around, forward and backward or to left and right? You surely have great long booms with fine dipper-sticks, haven't you? And powerful dippers with shiny, sharp, new teeth to bite, bite, bite into the earth.

My, but you all look strong! You'll be able to lift huge loads of dirt and rock, won't you? You'll be able to dig and dig and dig, and scoop and scoop and scoop, and bore and bore and bore."

Ned went from one machine to another, thinking how fine and strong and powerful they were, looking each over in turn, and examining all of their working parts.

Suddenly he stood quite still. Abso-

lutely still! His eyes grew bigger and rounder and the joyous smile left his face. He stared sadly at a great, new gasoline shovel that stood in the corner of the yard, a small distance apart from the others. His voice was full of pity as he exclaimed: "Why, you poor, poor thing you! I wonder why they did it to you. You're even stronger-looking than the other shovels! You're a great big fellow. Yes, a great big fellow. I wonder why they neglected you, Big Fellow. I wonder why they left you *without* your BOOM and DIPPER.

"It's just too bad, Big Fellow. It surely is." Ned shook his head. "Your tractor base looks great, your cab looks great, your turntable looks great. Why, oh, why, did

they have to go and leave off your boom with its dipper-sticks and your dipper with its sharp biting teeth? All the other machines have booms and dippers. Just poor you without! It doesn't seem fair, does it? Do you suppose you'll get them later on? Why have they been left off?"

Ned was getting madder and madder as he talked to the shovel:

“This poor gas shovel
Has no boom,
Nor any dipper strong.
I wonder when
They're going to come
To fit where they belong.

“Maybe, Big Fellow, I can find them for you. Shall I go and look?"

And just at that particular moment the

sunshine struck the metal body of the shovel, making it sparkle and gleam with dancing beams, as if it were smiling over Ned's suggestion, and answering:

“Find them, find them,

Please, won't you,

So that I my

Work can do?”

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“I will,” said Ned with flashing eyes, “I will if I have to look and look and look all day and all night, and all day and all night again. I will, Big Fellow.” And he walked away, his head held high and his shoulders thrown back—a very determined young Ned.

He walked across the yard. He pushed open the first door to which he came, and found himself in a room where many men

were busily working over drawings. They took no notice of him whatsoever, they were all so busy and interested in what they were doing. He went close to some of them, close enough to look over their shoulders and watch them work. They were making pictures, all different sorts of pictures. Ned didn't understand what most of the pictures were supposed to be. They were such queer-looking things.

"This is no place for me," thought Ned. "I'll never find any boom or dipper in here," and he started toward a door opposite the one through which he had entered, when, all at once, one of the drawings happened to strike his eye.

His heart went jumpety jump inside of

him. For, there, drawn on the paper were pictures of the very things he wanted. Yes, pictures of a boom and dipper.

He touched the sleeve of the man who was working on these drawings, and asked, "What are you doing there, mister?"

The man, however, was so very busy that he didn't want to be bothered; so he paid no attention to Ned, no attention at all.

"What are you doing?" Ned asked again. No answer from the man.

"Won't you tell me what you're doing?" begged Ned.

At which the man looked up for a moment, and mumbled over his shoulder:

"The shapes and size
Our drawings show

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Of parts that help
Machinery go."

And then turned back to his work.

"A lot of good you do me," thought Ned, with a sinking heart. "I guess I'll get no help in here, so I might as well run along. But, I *will* find that boom and dipper if it takes me all day and all night, and all day and all night again," and he walked out the door opposite the one through which he had entered, his head held high and his shoulders well back—a very determined young Ned.

He walked along a passageway until he came to another door. He pushed open this other door and found himself in a larger room filled with workmen wearing overalls and rolled up sleeves. Some

were busy shoveling black sand into great huge boxes, while others were pounding queerly shaped wooden pieces down into the black sand. Bang, bang, bang, they pounded with great heavy mallets—bang, bang, bang. Ned watched them. Why were they pounding? Ned went nearer, right close to one of the boxes.

“My!” he thought, “it’s funny what happens to the sand when it’s pounded. It packs down so tightly. It sure does. Why, it keeps getting harder and firmer! The more the men hammer, the harder and firmer it gets. I never saw sand before that sticks together that way. It doesn’t even look like sand any more; it looks more like smooth black clay, it’s so very hard and firm. Now what are they going to do?”

And he curiously watched the workmen take one of the queer wooden forms out of the firmly hammered sand.

“Goodness me!” Ned was surprised. “Why, it leaves the same kind of queer shape in the sand. It sure does.” Ned looked at the wooden form; Ned looked at the shape it had made in the sand. Yes, they were just exactly the same, yes, just exactly the same.

The men were so busy that they took no notice of Ned at all, at all. He wandered from one box to another. He wanted to see what kinds of shapes were in them. They *were* queer-looking things.

Finally Ned decided: “This is really no place for me. I’ll never find any boom or dipper here,” and he started toward a door

opposite the one through which he had entered, when all of a sudden a hole in one of the sand boxes happened to strike his eye.

His heart went jumpety jump inside of him. Could it be? Was it possible? Yes, it certainly did look like it, for there, in the firmly hammered black sand, had been pounded the very shape of a great enormous dipper, the very shape of Big Fellow's missing dipper. The hole in the sand was that shape! Yes, it was.

"What is it?" he cried, excitedly. "Say, mister, what is it?" But the workman to whom he had spoken didn't bother to stop his work even for a moment. In fact, he paid not the slightest attention to Ned.

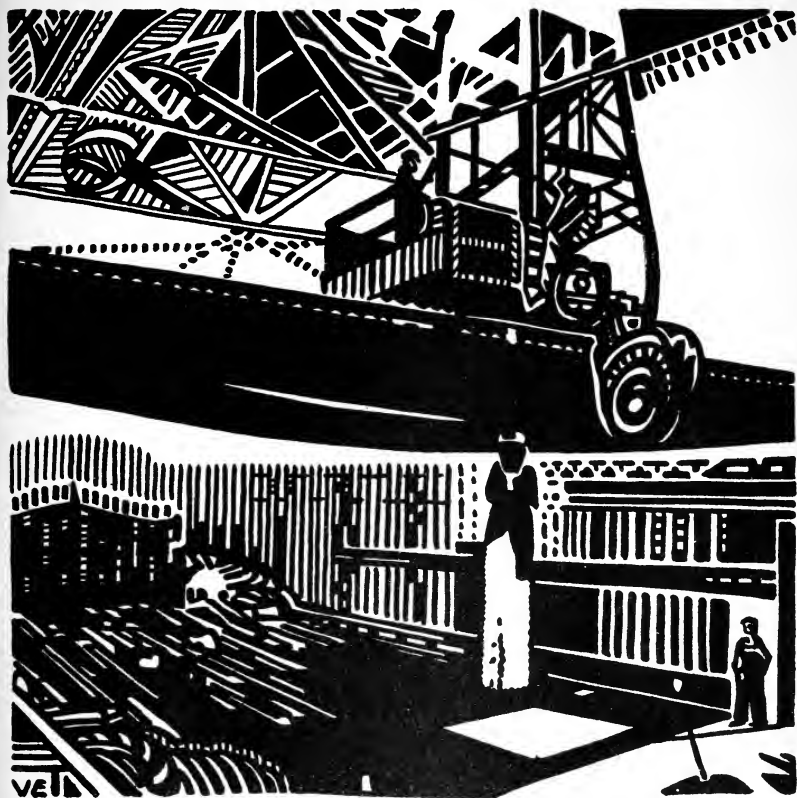
“Please won’t you tell me what it’s for?”
asked Ned again.

“All right, all right,” muttered the man:

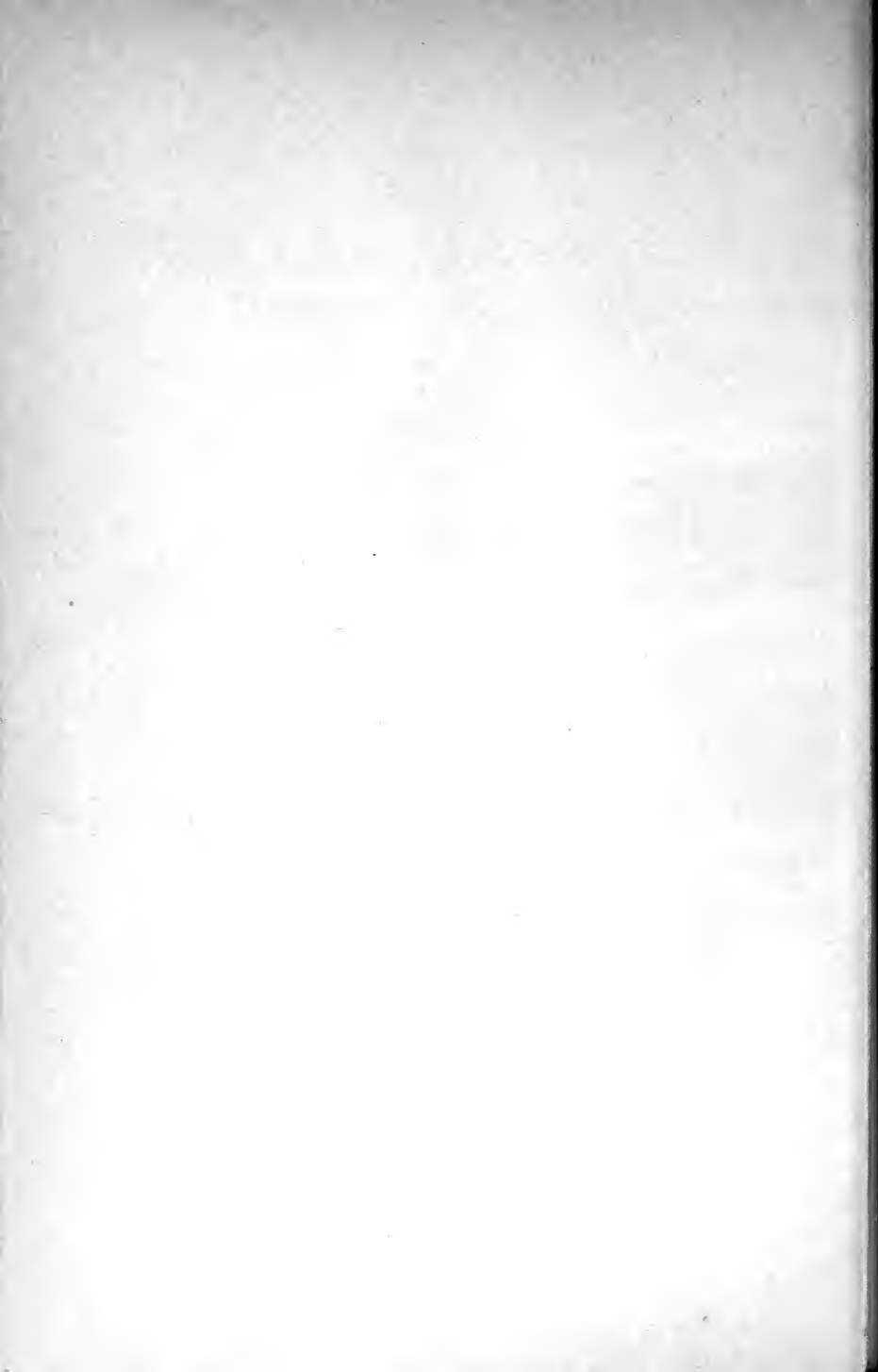
“The shapes in sand
Are pressed down so
Of parts that help
Machinery go.”

And that was all Ned could get out of him.

“Well,” thought Ned to himself, “I guess it won’t do me a bit of good to stay around here. I guess I’ll get no help in here, so I might as well run along. But I *will* find that boom and dipper if it takes me all day and all night, and all day and all night again,” and he walked out the door opposite the one through which he had entered, his head held high and his shoulders well back—a very determined young Ned.



HE CAME INTO A HUGE, ENORMOUS SHED



And so it happened that he came into a huge, enormous shed, where many, many men were working, where the hiss and the roar of flames and smoke filled the air.

At first he had to stop and stand still and take time to look around and find out what it was all about. The sounds of it, and the flicker flare, and the glare and the hissing and flashing were so confusing!

There, at the opposite side of the room, were great, high furnaces that spouted out fire and red, gleaming streams of smooth bright liquid into enormous buckets, buckets higher than the tallest man you could think of. Just imagine, such enormous buckets! There along the floor lay great big boxes filled with black sand, like

the ones Ned had seen in the other room, "only," noticed Ned, "these boxes here have been covered over. They've had wooden covers put on top of them."

And then Ned's ears caught a different sound—a creaking sound. Where did it come from? He looked above him.

"Oh!" he exclaimed out loud, forgetting, in his astonishment, that no one was listening. He was so surprised at what he saw overhead. He stared and stared in wonder.

"What on earth are they?" he gasped. "Tracks, I do believe. Tracks running 'way up high there under the roof. Gee! I never!! Can you beat it? What on earth are they for? What do they use them for up there? I've seen things running on tracks on the ground like trains or street cars, but

I've never seen tracks in the air before. Aren't they the very queerest things?"

For under the entire length of the shed's roofing stretched steel rails, like car tracks, and going across these rails went little cages, running back and forth, back and forth, 'way high above him.

"And look," Ned exploded. "There are men sitting in these cages—a man in each cage. They must be the drivers. And there are ropes or cables dangling, reaching 'way down from the cages. Some ropes are longer. Some are shorter. What makes them different lengths, I wonder? Oh, I see! The drivers have pulleys and levers that they can use to control the ropes. They can make them short or long—any

length they want. Those things certainly are keen!"

Ned didn't know yet that these things which filled him with such wonder were overhead cranes. But he kept on watching them as they ran back and forth, 'way high above him.

"See!" he exclaimed. "See the enormous hooks on the ends of the cable-ropes. See how the hooks fasten on to the big buckets. The furnaces fill the buckets



with red fiery liquid. As soon as one's full, why a hook comes along and fastens on to it. Then the man in his cage up above shortens the rope a

bit, just enough to lift the bucket from the floor. . . . Creak, eak, goes the crane, and away it slides, taking the bucket to one of the sand boxes, yes, carrying the bucket by its cable-hook to one of the sand boxes."



Ned saw the cranes tilting the buckets slowly, slowly by shortening cables carefully, carefully, until the red gleaming liquid went flowing in gentle shining

streams into openings that had been left here and there in the sand boxes.

“Oh! oh!” gasped Ned. “I wonder what they’re doing. I wonder, I wonder.”

And after a little while he gathered up courage enough to approach one of the men who stood by, seemingly looking on and seriously watching the work of the others.

“Please, mister,” said Ned—“please will you tell me what they’re doing?”

The man turned. “Why, hello there!” he said in a pleasant voice. “What do you want here, Buddy?”

“My name isn’t Buddy; it’s Ned,” explained Ned, politely. “I’ve come to find the dipper and the boom for the poor gas

shovel in the yard outside. I feel so sorry for it, I do.

“That poor gas shovel
Has no boom
Nor any dipper strong.
I wonder when
They’re going to come
To fit where they belong.”

“Well, Ned,” laughed the man, “as long as introductions are in order, my name’s Bill. And about that dipper, why, you’ve found the right place, all right. We make dippers here. That we do. And if you come this way I’ll show you how we go about it.

“See those things being shoveled into the furnaces. Do you know what they are? Well, the reddish pieces that look like un-

even stone blocks are called iron pigs. They go into the furnaces along with lime rock and scraps of used iron and coke to be heated hot, and hotter and hotter and hotter, until they start to grow soft and softer and softer and softer, and finally melt away entirely into the fiery red gleaming liquid that you see over there streaming out from the furnaces into the buckets.

‘Roar,’ says the furnace,
‘Roar and roar.
I’m heating metal
So ’twill pour.’

“Then, Ned, the cranes move the buckets, or ‘ladles,’ as they’re called, over to those boxes. In those boxes are holes of



FIERY, GLEAMING LIQUID STREAMING FROM THE
FURNACES INTO THE BUCKETS



certain sizes and shapes. They're called forms, they are."

"Yes, I know," exclaimed Ned, "I saw them in the other room. And one shape looked just like the shovel dipper."

"Right you are," answered Bill. "That's probably what it was. The box over there which they're pouring into right now has the exact same shape in its sand. The melted stuff being poured into it is hot, very, very hot. As it cools it will harden into black, strong cast iron and will have the exact shape as the hole in which it has been set."

"You mean," cried Ned, "that it will be a shovel dipper?"

"Quite so," nodded Bill.

“But, how’ll they get it out of the sand?” asked Ned.

“Oh, that’s easy,” Bill assured him. “When the iron is cool and firm, it’s a very simple thing to break the sand from around it.

Hard metal formed
In shapes that show
Some parts that help
Machinery go.”

Ned’s face was radiant. His smile stretched almost from one ear to the other. His eyes glistened and shone with joy.

“Oh!” he said. “Oh, I’m so glad, ’cause now I know my poor gas shovel is going to have its dipper.” Then, quickly, his face saddened again as he turned to Bill

and exclaimed, "But, Bill, with no boom, what good will the dipper ever do?"

Bill smiled. Without a word he led the way out of the foundry where the iron was being poured, out, and across the yard, and in through another doorway.

Ned had never heard such a clatter and clang of noises, such hammering and banging, and hammering and banging. "Clang, clang, clang!" sounded metal against metal. "Bang, bang, BANG! Bang, bang, BANG! Tacka-tacka-tack, tacka-tacka-tack — tacka - tacka - tack, tacka - tacka - tack!"

"ZZZZ!" groaned a cutting machine as it ripped apart a shining metal sheet. "Bam, bam, bam!" went a hammer as it pounded steel into shape.

“Steel sheets and bars,
Cut, shaped, bent so
Will also help
Machinery go.”

“Yes, here is where your boom is being made, and its dipper-sticks also,” said Bill. “You see, a machine like the big gasoline shovel outside isn’t made all in one piece. It has many, many parts to it. It has, for instance, its track or tractor base, on which it can move slowly, steadily over ground no matter how rough and bumpy. It has a car body with a turntable to swing it around and back, or to left and right. You’ve seen it work. You know how it swings, this way and that! It has its cab with a seat for the driver in it, and levers and gears to use when he drives the

shovel. It has a gasoline motor to make the shovel go.

“Each of these parts, Ned, is made up of still other, smaller parts which have been put together. Just as a little girl might take some cardboard with which to make a paper doll, and cut out separately hands and arms and fasten them together, and feet and legs and fasten them together, and head and neck and body, and finally fasten all together to make a finished paper doll, so the different parts of the shovel are made separately and then put together with rivets and nuts and screws and wheels and so on. Some parts are of iron, some parts of steel. You’ve seen the iron dipper being cast and the steel boom being cut and bent and shaped. Well, the rest of the parts

are made in much the same way. In fact, other machines, like mixers and graders and rollers, are all made in this way too.

Each part when
Put together so
Will help to make
Machinery go.”

As Ned went out into the yard once more, he walked proudly up to the gas shovel in the corner, and with a smile on his face, he said, “It’s all right, Big Fellow! You’re going to get your boom with its dipper-sticks real soon now. You’re going to get your strong biting dipper, too. Then you’ll be able to push down into the earth. Then you’ll be able to lift huge loads of dirt and rock, and be able to dig and dig

and dig, and scoop and scoop and scoop,
and bore and bore and bore.

That friend Big Fellow

Gets a boom

And dipper sharp and strong

I know now;

For they're coming soon,

To fit where they belong."

And that is how the finished gasoline
shovel was made!



HOW RED ROCK TRAVELED

BEFORE Ned left the factory on the day when he had seen how the finished gasoline shovel was made, Bill said to him, "Come back soon, won't you? I'd like to have you visit me again."

Ned grinned as he answered, "You bet I will."

Which he did! And not so many days later, at that!

He parked his bicycle in the yard and went in search of Bill, whom he finally

found sitting on a chair in front of a desk in a little room all by himself.

“Knock, knock!” at the door went Ned’s fist.

“Hello, there!” cried Bill when he caught sight of him. “Come on in. Well, well! how are you today?”

“Just fine,” smiled Ned.

“This is my office,” Bill explained. “Sit down in that chair there, Ned, and tell me about yourself.”

Ned sat down. Then, turning to Bill, he asked in a very serious, thoughtful voice: “Say, Bill, there’s something I’d like to know. I’ve wondered about it ever since I was here last time.”

“What is it?” questioned Bill.

“I’d like to know,” said Ned, “where the

metal comes from that's used in making machines like gas shovels and mixers?"

"You mean the iron and the steel?" asked Bill.

"Uh-huh," nodded Ned.

"All right," said Bill, rather thoughtfully, "I guess if I tell you the story of Red Rock, that'll explain it; so just lean back in your chair, young man, and make yourself as comfortable as can be. All set? Well, then, here goes!"

Once there stood a mountain of reddish-brown rocks covered over with reddish-brown earth. It was a quiet, peaceful sort of mountain. Nobody bothered it very much until one day a man came along who dug about a bit and looked curiously at the

reddish-brown earth and rock which he picked up, and then went quickly away again.

Soon after that, another day, the mountain was rudely awakened from its sleep by a clatter of noises, rude noises, loud noises.

“What’s this?” wondered Red Mountain as the noises came nearer.

“What’s this?” wondered Red Rock as the noises came nearer.

And soon they saw. Heavy trucks were approaching, rumbling up to the side of the mountain. Men jumped out and commenced boring holes in the mountain-side with their pick-axes and shovels. Into these holes they planted long sticks that looked like candles with cords dragging

from them. Red Mountain watched the men set lights to the ends of the cords and then quickly jump back out of the way.

“BANG!” sounded crashingly through the air, a huge, tremendously loud, startling “BANG!” Up, up, and UP went earth and rocks, spouting up, up and UP, tearing Red Mountain asunder, scattering pieces of Red Rock all about, leaving a great jagged hole. . . . Sticks of dynamite had blasted out the side of the mountain!

Red Rock was frightened, terribly frightened. It had been used to nestling peacefully down in the slopes of Red Mountain, and now, all of a sudden, it was scattered in great heaps, here and there and everywhere, with part of it still cling-

ing desperately to the unshaken remnant of mountain.

Soon a new clatter and clang of noises added to its disturbance.

“What’s this now?” gulped Red Rock as the noises came nearer.

Then it saw! Gasoline shovels and dump trucks were approaching, rumbling up to the hole.

“What can this be?” wondered Red Rock again, as it watched the preparations.

“Ssssst! . . . Chug-a-chug! . . . Putta putta putt!” sang a shovel. “You’ll soon see! You’ll soon see! Putta putt, chugga chug, sssst!” And its teeth went churning, burrowing into the open side of Red

Mountain, cutting in, biting in, until its dipper was filled with Red Rock.

Such a thing had never happened before. Red Rock trembled when the shovel's iron teeth sank in, biting burra burra, burra, burrrrr!

Red Rock cried out in dismay,

“What is to become of me?”

.....

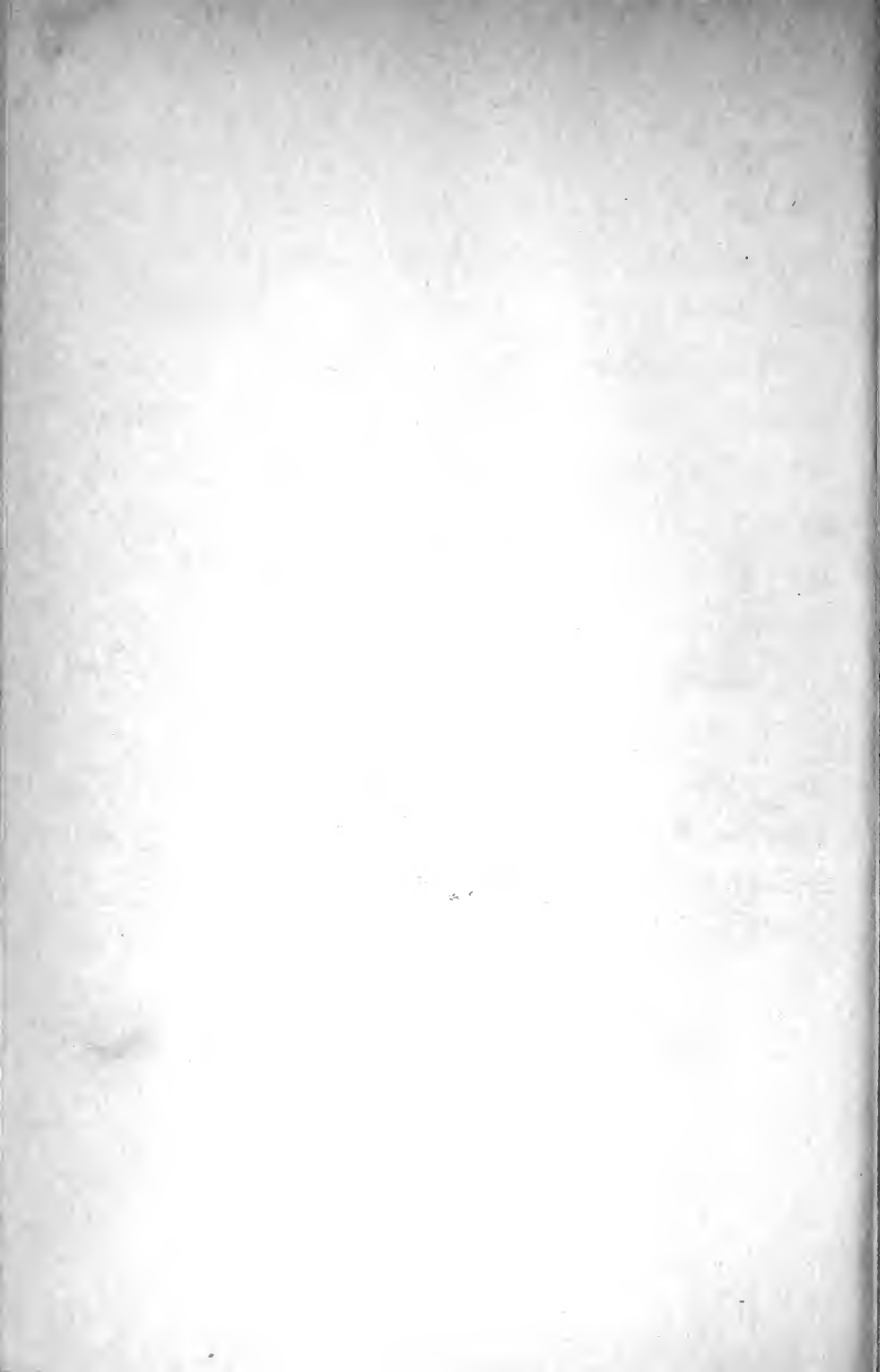
“Oh, ho, ho! Just wait and see!”

answered the shovel with a chug and a putt and a burra, burra, burrrr.

Into a dump truck tumbled Red Rock, still trembling and trembling as it fell clattering on to the metal floor of the truck. It was frightened, yes, frightened! It wasn't used to being torn away from Red Mountain.



RED ROCK TREMBLED WHEN THE SHOVEL'S IRON TEETH SANK IN



“Oh!” it moaned. “Oh,” it groaned. “What is happening? Whatever can be happening? Why is it happening? What can I do?”

“Lie still and stop your nonsense,” cautioned the engine of the dump truck, while its starter went “ggerrr,” and its heavy wheels commenced to turn around and around, moving slowly forward, away from Red Mountain.

Red Rock, at that, started to cry harder than ever. “Oh!” it moaned. “Oh!” it groaned. “What is happening? Whatever can be happening? Why is it happening? What can I do?”

What is to become of me?”

.....

“Oh, ho, ho! Just wait and see!”

answered the dump truck, thundering along.

Red Rock rode, bouncing about in the dump truck until it arrived at a station beside a railroad track. Here the truck came to a halt and Red Rock lay quietly resting for a little while.

Suddenly there sounded, "Choochoo-choo—toot, toot—ding-a-dong!" and a train pulled into the station.

"I'm here," cried its engine. "I'm here! I'm here with my tender and flat cars behind me. I'm here to take you, Red Rock, in my flat cars, and carry you away and away and away, 'way, 'way, far away. Ding-a-dong, toot, toot, Chhhh-hoooo!" And off went the train, carrying Red Rock in its flat cars.

Red Rock shook violently as the train rumbled on. It felt so lonesome away from Red Mountain. "Where are we going?" it asked the engine, which at that moment happened to be puffing up the side of a steep hill.

"Choo, sh, choo, sh, choo, sh!" scolded the engine. "Sh, sh, sh, I tell you! Stop your whining!"

"But," cried Red Rock, "I wish I knew where we were going. I wish I knew what was happening. I wish I knew!"

"What is to become of me?"

.....

"Choo, choo, choo! Just wait and see!"

answered the engine, now sliding merrily down the other side of the hill.

All of a sudden, "Tooooooot!" went the whistle, a shrill startled kind of a "tooooot!" and with a grating, grinding, grabbing of wheels and a squeaking and screeching of jammed-on brakes, the train came jerkingly to a standstill.

"Ch-hhooooo!" gasped the engine giving a great sigh of relief. "That was a narrow escape."

"Why?" cried Red Rock.

"Can't you see? Can't you see?" demanded the engine. "Can't you see there's a bridge out ahead of us? It's broken away near the center. If we had kept on going we would have been swimming or drowning in the river at this very minute. We would have gone tumbling from the broken bridge into the river below. And

you, Red Rock, would have sunk, deep down—down into the water. That's what would have become of you. It certainly was lucky that my engineer noticed the broken bridge in time. I thought he was crazy when he jammed on the brakes that way. Oh, how they tore along my body and cramped my wheels. It hurt for a moment, I can tell you; but not nearly as much as it would if we'd gone falling head-long into that river. Whoooooooo! what a narrow escape!"

"What'll we do now?" asked Red Rock.

"Wait, wait, wait, patiently," grumbled the engine, "until some repair crew arrives to fix the bridge. They always are mighty poky, those repair crews. Guess we'll have to wait forever!"

But the repair crew didn't take so long to get there. With cranes and pulleys and bars and beams they finally managed, after many hard hours of work, to prop up the bridge enough for the train to pass over.

"Ding-a-dong! Toot, toot! Choochoo-choo, choochoochoo!" hummed the train as it ran once more smoothly over the tracks, carrying Red Rock along with it.

After a while Red Rock grew calmer. The steady motion of the train lulled it to sleep.

The next thing it knew, the train had stopped on a dock at the water's edge. The tracks, so it seemed, ran down to the end of the dock. Beside the dock lay anchored a great steamer; and before Red Rock fully realized what was happening, it was being

scooped up by huge overhead cranes with shovel attachments, scooped and lifted and carried and dumped into the hold of the steamer.

There it lay, wondering what would happen next; for, never, never, never so long as it had nestled in the side of the Red Mountain had it ever dreamed that such things as dynamite, and gasoline shovels, and dump trucks, and trains with engines and cars, and bridges, and overhead cranes, and great steamers, such as this, even existed.

“Throbbada-throb, throbbada-throb, throbbada-throb, throbbada-throb!” vibrated the engines that lay far down in the inside of the great steamer. Then the ship commenced to move, slowly through

the water. "Woooo!" it trumpeted from its fog horn. "Clear sailing ahead, clear sailing ahead," it crackled in all its beams and timbers, while Red Rock lay thinking and thinking, and wondering and wondering, and waiting and waiting.

When the sun set, the fog began to settle, thick and heavy, over the water.

"Woooo! Woooo!" sounded piercingly from the steamer's fog horn,

"Look out, I'm here.

Other boats stay clear."

From the right and from the left and from the front and from the rear came answering fog horns. Little shrill fog horns' high "Toot, Toot!" great low fog horns' bass "Toot, Toot!" and away in the distance

a husky, hoarse fog horn that moaned a long flat "Tooot!"

It all sounded misty and weird and scary! As the fog horns signaled to each other, the steamer trembled in its beams and timbers and crackled and creaked,

"I can't see
Ahead of me,"

again and again,

"I can't see
Ahead of me,

and any minute we might go crashing into some other boat, the fog is so heavy and thick and dark."

For hours and hours, it seemed to Red Rock, they traveled along in the fog, until

all at once the horn burst forth in a different sound, a clearer sound, "Woooo!" a sharp, glad sound, "Fine sailing ahead! The fog has gone!"

Red Rock breathed a sigh of relief and settled down quietly once more. It was not aroused again until quite a while later when the ship's side scraped against the wharf as it docked.

"Hello, you there!" creaked a new overhead crane, staring down into the hold where Red Rock lay, and widening its huge jaws to clutch up masses of the rock. "Hello, Mr. Iron Ore! Your boat's late. Ran into a fog, did you? Clatter, clatter, there you go, tumbling into cars that will carry you to the blast furnaces."



AHEAD OF IT CRACKLED AND FLAMED THE FURNACE



“What are the blast furnaces?” cried Red Rock. “Where are they? What are they? What will they do to me?”

“What is to become of me?”

.....

“Oh, ho, ho! Wait and see,”

answered the crane. “You’ll see soon enough, Mr. Iron Ore, you will.”

“I even have to be called new names, around here,” thought Red Rock, sadly.

And then suddenly its fright grew to real terror, for there ahead of it crackled and sizzled and fumed and flamed the hugest, highest, most enormous furnaces.

“In you go! In you go! Right in so! In you go!” shrieked another crane.

“No, no!” pleaded Red Rock. “No, no!”

I will burn, the furnaces are so hot! Please, please no! I will burn. I am frightened.

“What is to become of me?”

.....

“Ho, ho, ho! Wait and see,”

was the last thing it heard amid the deafening sizzling and flaming of the furnaces, as the red flames leaped up to wrap themselves around Red Rock, who now appeared to be known as Iron Ore.

Warmer and warmer, hotter and hotter, seemed to grow the fire, dancing around Red Rock, covering it, lapping it with leaping tongues.

“I’m burning! I’m burning!” cried Red Rock. “I’m melting! I’m melting!” it groaned. “I’m melting away!

“What is to become of me?”

.....

“You’ll soon see! You’ll soon see!”

answered the crackling flames.

And then it seemed as if a great hot feeling of joy and light and splendor swept through Red Rock. All of its lumps, and bumps and rocky edges were entirely smoothed away. Do you know what had happened? . . . It had melted into a red shining liquid.

How proudly it shone, how brilliantly it glistened as it came pouring out of the furnaces into earthen molds!

“Look at me!” it sputtered and sang.
“Look at me! How I shine and shimmer!
How I glisten and gleam! I am no longer

shabby Red Rock, I am gleaming, molten Iron Ore.

“How fine, how fine,
I shine, I shine.”

Part of the melted iron ore ran into block-like molds. In these it remained to cool and harden. But as it cooled a sad thing happened—it grew paler and its gleaming brightness lessened.

It sighed, “I’m not shining as brilliantly any more.” It cried: “Alas! alas! I’m growing duller and duller as I cool and harden. Why do I have to cool and harden? I don’t want my shining golden color to turn back to drab, brownish red. Alas! alas! have I gone through all that melting and heating and burning for nothing?”

Then, all at once, it seemed as if the

great furnaces from which it had poured were trying to tell it something. It lay quite still, straining to hear.

“Yes, you may look duller,” sizzled the furnaces, “but the melting and heating and burning that we gave you were not all for nothing. No, indeed they weren’t. It’s true we didn’t make you lastingly beautiful, but we did make you stronger and cleaner and finer. We burned away the dust and dirt which were so closely clinging to you that you did not even notice them. We burned them away. We turned you into purer iron. We made you into stronger, harder, cleaner metal. Now you are no longer Red Rock or even Iron Ore. Now your name is Pig Iron. We made you into Pig Iron.”

“Ha—ha! Pig Iron! What a funny name!” chuckled Red Rock. “However, I imagine what the furnaces say must be true. I do feel cleaner and stronger. I do feel harder and firmer. . . .” But its thoughts were rudely interrupted, for suddenly, piece after piece of it was lifted from the molds and hurtled jangling, clang, clang, clang, into freight cars.

“Choo, choo! Toot! Ding-a-dong. How d’you do, Pig Iron?” puffed an engine. “Come along. Here you go. My train of cars and I will take you far away!”

“Where are you going to take me?” asked Pig Iron. “Where are you going to take me?”

“We-ell,” drawled the engine, “first

we're going to pick up some steel ingots, and then . . ."

"But what are steel ingots?" asked Pig Iron.

"Why, I'm surprised at your ignorance! Don't you know? Really don't you know? Goodness gracious! if you aren't a nuisance! I guess I'll have to explain it to you. What a bother! You see it's this way: You're not the only Red Rock that came from Red Mountain. Another load came, too, right after you. What happened to the other load? Now, don't keep interrupting me or I won't tell you, I simply won't. Well, as I was saying, another load came, too. This other load went into the furnaces just the way you did, and melted into red gleaming liquid, just the way you

did. But then, instead of being poured into those block-like molds in which you cooled, it was taken to mixing tanks, where different kinds of stuff were added to it and mixed and mixed together with it. . . . Say, didn't I tell you not to interrupt? You do it again and I won't go on! . . . Well, after that it was taken from the mixing tanks and sent to other furnaces. Yes, and heated all over again. Yes, and cooked and boiled again, until it sang, 'I feel much cleaner, lighter, cleaner even than after my first heating.' Then, and only then, was it poured into molds. No, not such little dinky molds as the ones you were in, but much bigger molds. . . . Well, anyway, it hardened in these molds just the same way as you hardened in yours.

You hardened into Iron Pigs, and it hardened into Steel Ingots. . . . There, now, stupid, do you understand at last what I meant when I said we'd have to pick up Steel Ingots?"

"Yes, I do," said Pig Iron, "but please don't call me stupid. I'm not."

"Choo, choo, choo! You are, too!" coughed the engine. "I'll bet you don't even know what's going to happen to Steel Ingots."

"No-o, I guess I don't," Pig Iron had to admit. "But you can tell me."

"Of course I can! Of course I can! I'm not stupid," answered the engine. "I'm going to take Steel Ingots to a steel mill, where they'll be heated again, yes, heated

all over again, and then be kneaded in rollers and fashioned into sheets of steel that will be used for making machinery and lots of other things. . . . So there, stupid!"

"Now, please don't keep on calling me stupid," begged Pig Iron. "I'm not."

"Choo, choo, choo! You are, too!" coughed the engine. "I'll bet you don't even know what's going to happen to you."

"No-o, I guess I don't."

"Well, you're going to an iron foundry, where you also will be heated again, yes, heated all over again, and then be poured into cast iron shapes to be used for making machinery and lots of other things. . . .

Now, no more questions. Come on! Here we go! Choo, choo, choo! Toot! Ding-a-dong!! Lie still while I pull you and the Steel Ingots that have both been made from Red Rock. Toot, toot! Ding-a-dong! Choochoo, choochoo!

Far, far up in the mountain,
Where fast asleep you lay,
There came some men with dynamite
To blast out holes one day;
And then in dump trucks, train, and boat
You traveled 'way away.

You came into the smelting-plant.
You heard how furnace roared.
You burned therein to melted gold
And then in molds were poured.

And now you've cooled to Iron Ore
And firm Steel Ingots, too,
So strong and durable and hard,

So many things you'll do,
That great machinery which goes
Will soon be made from you."

And that is how iron and steel came to the
factory!

4.

HOW BIG FELLOW LEARNED TO WORK

NED returned to the machine factory, over and over again. Sometimes he would visit Bill, or wander through the various workshops. Other times he would spend an hour or so looking at the machinery in the yard. But he made it a point never, never to forget to greet the great gasoline shovel for whose boom and dipper he had searched on his first visit to the factory.

“Hello, Big Fellow!” he would say each

and every time when he came. "Good-by, Big Fellow," he would say each and every time when he left.

And so it happened that, from overhearing him, most of the men around the factory also came to speak of this particular shovel as "Big Fellow."

"Big Fellow hasn't been sold yet," they would say, or "Big Fellow is still in the yard today," or "Big Fellow hasn't found a job yet."

Ned noticed, too, that many of the machines which he had seen at first were no longer around, but Big Fellow continued to stay in its same corner day after day. He knew that the other machines had been sold to contractors and had gone out to work; he knew that some of them had

been sent far away to different cities, while others had gone off to places near by where digging and trenching and excavating were to be done. Ned wondered why Big Fellow, who looked so strong and powerful and ready to work, had not been sold and sent off to a job. He was glad in one way, because he could now see Big Fellow whenever he came to the factory.

How he hated to think that the shovel might some day have to travel to a far, far distant place, where he would no longer be able to see it. But still, he knew that Big Fellow could work and should work and ought to be doing work; and he wondered why, instead, it continued to remain in the yard.



"Bill," he said one day, "why hasn't Big Fellow been sold? Why haven't you found a job for it?"

"Well," Bill answered, "you see, Ned, on account of all that delay over the boom and the dipper, we just haven't gotten around yet to Big Fellow's try-out."

"What do you mean, its try-out?" questioned Ned.

Bill laughed. "Why," he said, "we have to be sure Big Fellow can work properly before we let it go out. Just imagine if we sold it to some contractor who had a road to build, and who wanted the shovel to help—just imagine, how furious he would be if, when the lever was moved for Big Fellow to go forward, it would go backward instead; or if when the signal was

given for the boom to shift to the right, it would shift to the left instead. Oh, that contractor would be mad! He'd write us a letter and he'd say a few things that we wouldn't like to hear, and he'd never, never order any more machines from our factory. Which would hardly do! So we try out each and every machine that is sent away from here. We see that each one learns to work properly before we let it go."

"When are you going to try Big Fellow out?" inquired Ned.

"Wait a minute; I'll see," Bill answered. "Hey, Bob, when is this shovel's try-out scheduled?—Tomorrow? O. K.," and then turning back to Ned, he asked, "Want to come and watch tomorrow? Sure you do."

As Ned left the yard that afternoon, he called good-by to Big Fellow, and added, "You really look forlorn, Big Fellow. You do! I guess when you're strong and powerful and fit and fine, the way you are, it must make you kind of sad to have to stick around the yard instead of getting in and digging and doing what you're made for. I know

With a whirl and a whir
And a jump and a jerk,
You want to start work,
You want to start work.

Well, so long, Big Fellow. And cheer up, 'cause after tomorrow things'll be different! Only, I hope you won't be sent far, far away where I'll never be able to see you any more!"

The next afternoon Ned was there, all right, all right, to watch the try-out and see how Big Fellow learned to work.

A whole group of men were gathered around the shovel. First they inspected the cab. They looked at the gears and levers. They shoved the levers backward and forward.

“This one needs more oil,” said the foreman, “and that one, too.”

They oiled the gears and levers so that they could shift them swiftly and easily. And then they went to the engine.

They inspected the engine. They fed it water in its tank. They fed it oil and they gave it gasoline. They looked it over to see that all its parts were in order. Then, “Ready, go!” called the foreman.

“Jjjerrr!” cried the engine, “Pffuttt!” it died down.

“Oh,” wailed Ned, “won’t it go?”

“Jjjerr!” screeched the engine, and then, “Pffuttt!” it died down.

“Hold on there!” shouted the foreman, “Carburetor needs adjusting. . . . All right. Try her again.”

“Jjjerrr!” shouted the engine, and then began to cough violently, “Huffa cuff, huffa cuff!” Then more quietly, “Huffa cuff, huffa cuff!” And more steadily, “Huffacuff, huffacuff!” And more smoothly and evenly until it changed to a steady, rhythmic hum. “Putta putta putt, putta putta putt!” sang the engine, over and over again, keeping time evenly,

smoothly. "Putta putta putt, putta putta putt!"

Then the men inspected the track of the big gas shovel, the strong tractor base that would carry it equally well over smooth ground and rough. And when they thought that every part of it was in order, the foreman cried to a man in the cab, "Let her go."

A gear shifted. Forward went the great body, slowly forward, rolling along on its track, rumbling on forward. . . . "Steady now," called the foreman, "And . . . reverse!" The gear was pulled. Back rolled the great body, slowly, noisily backward on its track, just as it was supposed to do.

"All right," cried the foreman, "Stop."

Then they inspected the ring-disc on which the cab was made to turn this way and that. And when they thought that every part of it was in order, the foreman gave the signal to try it out.

Another lever was pulled. Around swung the great body to the right. Again the lever! Around and back and to the left! And again, in response to the lever, all the way around went the body, swinging its boom in a wide half-circle, so that now the front of the shovel was pointing where the back had been before. Half turns and quarter turns and full turns were tried. Big Fellow did them all!

“All right,” shouted the foreman, “Stop.”

Then they inspected the boom and

dipper-sticks, and the dipper with its strong biting jaws, and the rope-like metal cables that were attached. And when they



thought that all of these were in order, the foreman again cried, "Let her go."

Another lever was moved, "Ggrrrr!" cried the engine. Down and forward pushed the dipper, its jaws opening wide.

"Click," snapped its teeth as they suddenly closed. Up, up, up, lifted the dipper. Around turned the cab. Apart swung the great jaws as the bottom of the dipper dropped downward, stretching the shovel wide open. . . . Up and down, apart and together, open and closed, around and back. . . . Over and over again, until with a grin of satisfaction the foreman finally gave the signal to stop.

He rubbed his hands together. He smiled at Ned. "Another beauty," he chuckled. "Another dandy. No better shovel made! I can tell you, no better shovel made."

As the engine gave its final puttaputts before stopping, Ned thought he could hear in its hum,

“With a whirl and a whir,
And a jump and a jerk,
I want to start work,
I want to start work.

With a healthy loud burr,
And a rhythmic chug-chug,
I’ll stay at my job
Till it’s finished and dug.”

“I know you will, all right,” nodded Ned in answer.

The shovel was quiet. Ned thought the try-out was over. He stood watching some men who were gathered at the dipper end of the shovel and seemed to be fixing something on the dipper. As he stood watching them dreamily, he suddenly started forward, and his thoughts woke with a jolt. OH! OH! OH! What were

they doing? He felt like crying out: "No, no, NO! You mustn't do that! You MUSTN'T, you MUSTN'T!"

The group of men around the dipper were doing the most terrible thing. **THEY WERE TAKING THE DIPPER OFF!**

"OH," cried Ned, "you can't do that, after Big Fellow has shown you how well it can work! The foreman said it worked well! Where is he? You must stop doing that! . . . Bill! BILL! Where is Bill? He'd never let you do it if he knew!" And away went Ned dashing across the yard in search of Bill.

He found him in his office. He grabbed him by the hand. "Come quickly, Bill!" he cried. "Don't let them do it to Big

Fellow! Hurry, hurry, HURRY, Bill! Oh, please hurry!"

Bill looked a bit bewildered. He couldn't imagine what it was all about. But he followed Ned down into the yard, and when he saw what was happening, why, what do you suppose he did? He put his hands on his hips and shouted, "Ha, ha, ha! Ned, this time the joke's on you. Don't you know that this Big Fellow has more than one kind of end that can be attached to it? They're not breaking it or hurting it. They're taking off the shovel boom, and dipper-sticks to replace them by a crane boom and clam-shell end. And after they see that the clam-shell, too, knows how to work, why, then they'll take it off and put on the drag line. Big Fellow

has several ends, you know, which can be attached in turn, each one made and designed to do a different type of work."

Ned was too astonished to say very much. He just stood there, quietly look-



ing on. He watched the clam-shell end of the crane attachment open and close its two rows of teeth. He thought how powerful it looked, as if it could grab and lift great loads of rock or stone or other

materials. No, it wouldn't be able to bite into the ground as well as the dipper on the shovel end could, but it would be able to lift greater loads.... Closed and open, open and shut, wide apart and click together! Yes, it could work also!



And when in a little while the drag-line end was attached in place of the clam-shell, Ned exclaimed: "Oh, I see what *you* can do! You have teeth on your back end, nearest the shovel body. You pull dirt backward instead of pushing it forward. If there were earth and rocks that had to be scraped and pulled up out of a deep hole or ditch, you could be let 'way down by

your long rope. You could do it, all right, but the shovel dipper couldn't. It wouldn't be able to reach down that far. You know how to work, too, don't you?

"Honestly, Big Fellow, I had no idea you could do so many different things. You're even better than I thought you were. My! but I hope they aren't going to send you miles away! My! but I hope you'll still be here the next time I come back! So long, Big Fellow, good-by."

And, as he left he could hear Big Fellow's engine humming:

"With a whirl and a whir,
And a jump and a jerk,
I want to start work,
I want to start work.

With a healthy loud burr,
And a rhythmic chug, chug,
I'll stay at my job
Till it's finished and dug.

My parts can all go,
My engine can spin,
I'm steady, I'm ready,
I want to start in,
I'm steady, I'm ready,
I want to begin."

And that is how Big Fellow learned to
work!

5

HOW NED LOST BIG FELLOW

ONCE, as you know, there was a little boy. His name was Ned. He lived in the country in a red wooden house. All around the house were fields and fields and more fields of waving wheat. At one time there had been no other houses near Ned's, nor any busy markets, nor any stores. No, there had not even been a street near Ned's house. No, no street at all. Imagine! No smooth-paved street. There had been only a dusty dirt road that

ran between the fields and happened to pass right in front of Ned's house, and which wasn't really a street, it was so bumpy and rough.

Now, however, things were different. The little boy Ned still lived in his red wooden house in the country; but in front of his house there now ran a smooth road, which stretched along, on and on and on, for miles and miles and miles.

Other things, too, were different. The smooth road had made them different. Yes, the smooth road had made them different! For, as soon as the smooth road had been finished, people had come riding over it in automobiles. Some of these people had said, "Look! oh, look at the lovely green fields! This is a fine place to

live.” And other people had said, “This is a fine place to live!” And still others had said, “This is a fine place to live.” And many of them had really, truly made up their minds to buy land along the smooth road and to build houses on the land and to live in them. So one had built a house here, and another had built a house there, and another had built a house farther along, and another still farther along, until there were houses here and there and everywhere on either side of the smooth road.

Then the people had moved into the houses, of course—sometimes only grown-up people, but often children also. And that was what made the biggest sort of difference to Ned—a bigger sort of dif-

ference than anything else; because it meant that he now had other children to play with and didn't have to be alone each and every day and all of the time.

But he still liked to be alone part of the time; he still liked to take out his bike and ride, ride, ride along the smooth white road between fields of wheat with their brand-new houses, and past older farm-houses with horses in their pastures, and chickens and pigs in their pens, until at last he would come to where the fields grew smaller and the houses stood closer together. Then he would whistle with joy and think to himself: "Hurray! I'm near the city! Hurray! I'm near the machinery factory! Hurray! I'm near Big Fellow!"

And often, too, especially since Big Fel-

low's try-out, he would wonder: "But will I really see Big Fellow, or has Big Fellow been sold? Is Big Fellow still in the yard, or has Big Fellow gone out to work?"

Ned wanted Big Fellow to go out to work. He did indeed. He felt that Big Fellow was anxious, so anxious to begin its work. But suppose Big Fellow were sold to some contractor who lived far, far away. Why then, Big Fellow would have to travel far, far away, and then Ned would never see it again. No never. . . . Wouldn't that be too sad? Wouldn't that be too bad?

One day Ned rode into the factory yard. He parked his bike and started for Big Fellow's corner.

"Hello, Big Fellow!" he called even before he got there. "Hello ——" He

stopped quickly and suddenly. For Big Fellow was no longer in its corner. Big Fellow was . . . gone.

Quickly Ned turned. He looked all around the yard. But no, there was no Big Fellow to be found.

He saw a mechanic working on one of the mixer drums. He rushed up to him and asked,

“Where’s Big Fellow gone to?
I don’t know, and I want to.”

The mechanic looked at him. The mechanic didn’t seem to understand. He didn’t answer Ned at all.

“Where’s Big Fellow? Please, mister, won’t you tell me? Where’s my Big Fellow? Where’s the gas shovel that used to

stand over in that corner? Where's it gone? Won't you tell me? Has it been sent far away, or is it working near here? Oh, please, won't you tell me?"

The mechanic grunted. Then he shrugged his shoulders. Then he turned back to his job. Ned didn't think he was going to answer. But he did. And this is what he said:

"They send machines away on ships.

You really didn't know?

Yes, far, so far away on ships,

Wherever they must go."

"Oh!" sighed Ned. "Oh!" cried Ned. "Oh, OH, OH!" in a very sad, sad voice. So his Big Fellow had been sent away on a ship. He'd never see it again. The tears started to come, he was so very, very sad.

"What ship did Big Fellow go on?" he managed to ask.

"I dunno," answered the mechanic.

"Well, didn't you say it went away on a ship?"

"I said machines do. I never said nothing about what machine."

"Then you didn't mean Big Fellow?" Ned's face was brightening again.

"I never said nothing about no Big Fellow."

Ned breathed a sigh of relief. Maybe, after all, Big Fellow hadn't gone away on a ship. He'd ask some one else. He'd look for Bill. Bill would know. Yes, surely Bill would know.

He ran into Bill's office. Bill wasn't there, but another man was.

“I’ll ask him,” thought Ned.

“Where’s Big Fellow gone to?
I don’t know, and I want to.”

The man looked at him. The man looked puzzled.

“Don’t you know, either?” wailed Ned.

“Don’t I know what?”

“Don’t you know where my Big Fellow is?”

“Why, who’s your Big Fellow? I’m kinda new around here, and I guess I don’t know what you’re talking about.”

“Oh!” exclaimed Ned, and tried to explain more clearly. “That’s what we call the big gas shovel that used to be out in the corner of the yard. Don’t you know where it’s gone? The great big one, you know.”

The man seemed thoughtful. He waited quite a little while before he answered. Ned began to think he wasn't going to answer. But he did. And this is what he said:

“They send machines away on trains.

You really didn't know?

Yes, far, so far away on trains,

Wherever they must go.”

“Oh!” sighed Ned. “Oh!” cried Ned, “Oh, Oh, Oh!” in a very sad, sad voice. So his Big Fellow had been sent away on a train. He'd never see it again. The tears almost started to come, he was so very, very sad.

“When did it go?” he managed to ask.

“I'm sure I don't know,” answered the man.

“Well, didn't you mean it went on a

train? Aren't you sure about Big Fellow's going on a train?"

"No," said the man. "No, I'm not sure about anything about any machine. I just mean, machines go on trains, you know. That's all I mean."

Ned breathed another sigh of relief. Maybe Big Fellow hadn't gone on a train. He'd have to find Bill. Surely Bill would know. Where was Bill? Where on earth was Bill?

"Hello, there!" said a voice behind him, a very familiar voice—yes, Bill's voice.

Ned's face brightened. "Gee! Bill," he exclaimed, "I never was so glad to see anybody! Gee! Bill, I'm glad to see you!"

Where's Big Fellow gone to?

I don't know, and I want to.

Has Big Fellow been sold? Has it gone away on a ship? Has it gone away on a train? Will I ever see it again? Where's it gone?"

"Here, here, steady, steady," said Bill, commencing to laugh. "You want to know too many things all at once. Has Big Fellow gone on a ship? Has Big Fellow gone on a train?" Bill laughed harder, and then started to tease,

"They send machines away on trucks.

You really didn't know?

Yes far, so far away on trucks,

Wherever they must go."

"Oh!" sighed Ned. "Oh!" cried Ned. "Oh, Oh, Oh!" in a very sad, sad voice. So his Big Fellow had gone away on a truck.

He'd never see it again. The tears almost started to come, he was so very, very sad.

But when Bill saw how really, truly sad Ned was, he stopped teasing and said: "Look here, Ned, old top. You mustn't carry on that way. You know you've been just as anxious right along for Big Fellow to get to work as any of us. Why, you'd be the last person in the world to want to have Big Fellow spend all of its life sitting in the corner of the factory yard. Now, wouldn't you? Of course you would! Imagine, a perfectly good gas shovel staying perfectly still all of its life in the corner of a factory yard! That would never do, no, never, never."

"No, never, never," agreed Ned, "only

I'm going to miss my friend Big Fellow so much. I surely am, Bill. You don't know!"

"Miss Big Fellow?" Bill exclaimed. "That's where you're mistaken," and a twinkle shone in Bill's eye. "Say, kid, come along with me, this way. I want to show you something."

Bill led Ned out of the office. Bill led Ned out of the building. Bill led Ned out of the yard and around the corner into a back alley. And there, what do you suppose Ned saw, standing grand and strong and shining? . . . Big Fellow! Yes, Big Fellow!

"It's been sold, you see," Bill explained, "and it's waiting here to start out for its first job."

“How’s it going? Where’s it going? What’s it going to do? What sort of a job is it going on? Is it going far away? Will I ever see it again?”

Bill put his hands up over his ears. “Say, Ned,” he cried, “for Pete’s sake bottle the questions. You sure can ask more in a minute than any boy I ever saw.”

“But tell me, Bill, go on tell me.”

And then Bill did something very strange. He looked at Ned, right straight at Ned, and he said in the most serious voice Ned had ever heard him use, “To-day’s my busy day, kid. See? And this is my busiest hour. I haven’t time to answer all your questions. I’ll tell you this, though, and this is a promise: You haven’t

seen the last of Big Fellow. You haven't heard the last of Big Fellow. You're going to see lots more of it. You're going to hear lots more of it ——"

"Why," interrupted Ned, "what do you mean?"

"Just this"—and Bill was more serious than ever. "That Big Fellow IS NOT GOING FAR, FAR AWAY. And that's that."

"Then can I watch its jobs and see what it does?"

But Bill wouldn't tell Ned another word. No, he wouldn't!

Ned, however, didn't mind. Ned was so glad—glad that he was not going to lose Big Fellow. Happily he thought:

“Big Fellow’s here,
Big Fellow’s near,
It’s *not* going far away.
Its work I’ll see,
Its jobs’ll be
Where I can watch each day.

And I’ll know, too,
What it can do,
And hear its motor run.
And then I’ll say,
‘Hurray! hurray!
Big Fellow’s work’s begun!’ ”

And that was how Big Fellow left the
factory yard!

And that was how Ned began to look
forward to seeing Big Fellow work at its
different jobs.

And if you want, why, some day, too,
There'll be another book for you—

A book about Big Fellow.

About the things it builds and makes,

About the different jobs it takes,

About its engine's whirl and whir,

About its dipper's biting burr,

This book about Big Fellow.

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